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a. The longitude and latitude in which the observations have been made.

b. Whether the telescope inverts or not, as well as its magnifying power.

J. F. Julius Schmidt,
Astronomer.

Royal Observatory at Bonn, Prussia,
Feb. 19, 1853.

Tables du Mouvement apparent du Soleil, deduites de la Comparaison de la Théorie avec les Observations faites depuis 1750 *jusqu'à nos Jours.* Par M. Le Verrier.*

M. Le Verrier having, about two years since, executed a complete theory of the perturbations by which the apparent motion of the sun is affected, was subsequently induced to institute a comparison between his theory and an extensive series of observations of the sun. These researches have resulted in his construction of new solar tables, forming the subject of his present communication to the Academy of Sciences. The most remarkable part of this communication is the announcement of an irregularity in the motion of the solar perigee, which it seems impossible to account for by the existing theory of the sun's motion.

M. Le Verrier proposed to establish his investigation of the correction of the elements of the solar orbit upon the observations of the sun made by Bradley at Greenwich, about the middle of the last century, and the modern Greenwich observations. The results thus deduced might be verified by comparing them with a series of observations made about the middle of the included interval.

He selected for the earlier materials of his investigation 719 observations of the sun made by Bradley between the years 1750 and 1762. The modern data consisted of 516 observations, made under the superintendence of the present Astronomer Royal between the years 1840 and 1850. These observations were reduced by the aid of the fundamental catalogue of stars recently constructed by M. Le Verrier.

Having determined the secular variations of the excentricity and the perigee by comparing their values as derived from the two sets of observations, and taking into account the included interval of time, extending to ninety years, M. Le Verrier obtained results which appeared to him incompatible with any admissible change in the masses of the disturbing planets.

With the view of throwing light upon the subject, he had recourse to intermediate observations. For this purpose he chose 631 observations of the sun, made at Greenwich, Paris, and Palermo, during the years 1801–2–3–4. A rigorous discussion of these data served only to increase his perplexity. The correction of the ex-

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* *Comptes Rendus*, tome xxxvi. p. 349.

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centricity did not indeed offer any difficulty, being equal to the mean of the corrections found for the years 1755 and 1845, as ought necessarily to be the case, if the correction varied according to the first power of the time. With respect to the correction of the perigee, however, the case was quite different. Instead of being equal to the mean of the values found for 1755 and 1845, it was very considerably larger than either. Thus it appeared that the secular variation of the solar perigee, as deduced from the observations, besides being incompatible with the admitted values of the masses of the disturbing planets, presented the additional difficulty of not being simply proportional to the time.

A further appeal to observation seemed to offer the only means of arriving at some definitive solution of this question. M. Le Verrier accordingly had recourse to 241 observations, made at Greenwich during the years 1783–85, and to 1037 observations made at Greenwich, Paris, and Königsberg, during the years 1814–18. The number of observations of the sun which formed the groundwork of his researches consequently now amounted to 3144. By a comprehensive and searching discussion of the totality of these data, he finally arrived at the conclusion that the variable correction of the solar perigee might be represented by the following formula:

$$-7''\cdot9 + 0''\cdot535\,t + 29''\cdot8 \sin(5^\circ\cdot4\,t + 207^\circ\cdot85)$$

in which t expresses the number of years, counting from the beginning of 1850. The following table exhibits a comparison of the results derived from this formula, with the corresponding results of observation:

Date.	Correction of the Solar Perigee deduced from the Observations.	Calculated Correction.	Calculation —Observation.
	″	″	″
1753·3	−39·4	−38·5	+0·9
1759·0	−25·3	−27·7	−2·4
1784·4	−56·4	−59·3	−2·9
1801·5	−62·3	−58·1	+4·2
1803·5	−46·5	−53·3	−6·8
1815·3	−20·9	−16·1	+4·8
1817·7	− 8·1	− 8·6	−0·5
1842·8	− 2·7	− 6·0	−3·3
1848·2	−24·4	−18·2	+6·2

From the close agreement which subsists between the observed and calculated corrections of the solar perigee, as exhibited in the foregoing table, M. Le Verrier considers himself fully authorised in announcing that, independently of the movement, the cause of which is known to us, *the solar perigee is subject to an oscillation whose amplitude is 60″ and whose period is 66$\frac{2}{3}$ years.* He further concludes, that, besides this periodic oscillation, the solar perigee is subject to a secular variation of $53\frac{1}{2}''$ which is not produced by the action of known masses. The excentricity of the solar orbit offered

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indications of a similar variation, but of a magnitude much less pronounced.

Without professing to announce a positive opinion on the subject, M. Le Verrier seems disposed to think that the combined action of the minor planets may not impossibly be the cause of these irregularities.

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*Elements of Themis.** By MM. Forster and Krüger.

(*Communicated by Professor Argelander to the Rev. R. Sheepshanks.*)

The following elements of the planet *Themis* were calculated by MM. Krüger and Forster, from two observations made at Naples on the 6th and 13th of April, and two observations made at Bonn on the 27th of April and the 10th of May.

Epoch 1853, May 10·43140, Berlin M.T.

	°	′	″
M =	341	52	26·8
π	213	32	44·2
☊	32	26	35·3
ι	0	53	46·8
ϕ	14	21	14·2
Log a	0·561038		
Log μ	2·708450		

A comparison of these elements with the observations gives the following results:—

		Theor. — Obs.	
		$\Delta\lambda$	Δl
		″	″
April	6	−0·4	+31·6
	13	−0·2	− 0·9
	27	+1·0	− 0·8
May	10	+0·1	−18·8

Accompanying these elements was an ephemeris of the planet, calculated by M. Krüger, and extending from May 20 to June 17. Any Fellow of the Society may obtain a copy of this ephemeris, by applying at the Apartments of the Society.

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* This name has been selected for the planet by Sig. Secchi, at the invitation of the discoverer, M. De Gasparis. It is the same name which M. De Gasparis originally intended to confer on the planet *Massalia*.

ERRATA.

Vol. XIII. Page 87, line 1 from top, *for* 1852 *read* 1853.
— — 156, — 22 — *for* Stoddart *read* Stoddard.

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